

WHAT IS CLAIMED IS:

1. An electrospray device having flow-contacting portions comprising an affinity chromatographic adsorbent.
2. The device of claim 1, wherein said affinity chromatographic adsorbent comprises a coated layer.
3. The device of claim 1, wherein said affinity chromatographic adsorbent comprises a porous polymer monolith.
4. The device of claim 1, wherein said flow-contacting portions comprise at least one through-device channel in fluid communication with a reservoir.
5. The device of claim 1, wherein said affinity chromatographic adsorbent comprises an immobilized metal ion chelating ligand.
6. The device of claim 5, wherein said immobilized metal ion chelating ligand comprises iminodiacetic acid, nitrilo triacetic acid, or tris(carboxymethyl) ethylene diamine.
7. The device of claim 1, wherein said affinity chromatographic adsorbent comprises an immobilized ligand molecule comprising an organic compound, fatty acid, inhibitor, protein, peptide, enzyme, coenzyme, receptor, affinity tag, nucleic acid, antibody, biotin, avidin, carbohydrate, lectin, dye, or protein surface domain involved in molecular recognition.
8. The device of claim 7, wherein said immobilized ligand molecule comprises a potential drug candidate or a mixture with potential drug candidates from a combinatorial compound library, benzamidine, D-biotin, biotinylated molecules, Avidin, Protein A, antisense peptides, antisense Arg-vasopressin peptide, trypsin, adenosine 5'-monophosphate (5'-AMP), Interleukin-2 receptor, polyamino acids, polyhistidine, histidine, lysine, a fragment of calf thymus DNA, sheep anti-rabbit IgG,

monosaccharide, monosaccharide derivative, concanavalin A, or Cibacron Blue F3G-A.

9. The device of claim 1, further comprising a micro column in fluid communication with said flow-contacting portions.

10. The device of claim 9, further comprising an affinity chromatographic adsorbent within said micro column.

11. The device of claim 10, wherein said affinity chromatographic adsorbent within said micro column comprises a coated layer.

12. The device of claim 10, wherein said affinity chromatographic adsorbent within said micro column comprises a porous polymer monolith.

13. The device of claim 10, wherein said affinity chromatographic adsorbent within said micro column comprises an immobilized metal ion chelating ligand.

14. The device of claim 13, wherein said immobilized metal ion chelating ligand comprises iminodiacetic acid, nitrilo triacetic acid, or tris(carboxymethyl) ethylene diamine.

15. The device of claim 10, wherein said affinity chromatographic adsorbent comprises an immobilized ligand molecule comprising an organic compound, fatty acid, inhibitor, protein, peptide, enzyme, coenzyme, receptor, affinity tag, nucleic acid, antibody, biotin, avidin, carbohydrate, lectin, dye, or protein surface domain involved in molecular recognition.

16. The device of claim 15, wherein said immobilized ligand molecule comprises a potential drug candidate or a mixture with potential drug candidates from a combinatorial compound library, benzamidine, D-biotin, biotinylated molecules, Avidin, Protein A, antisense peptides, antisense Arg-vasopressin peptide, trypsin, adenosine 5'-monophosphate (5'-AMP), Interleukin-2 receptor, polyamino acids,

polyhistidine, histidine, lysine, a fragment of calf thymus DNA, sheep anti-rabbit IgG, monosaccharide, monosaccharide derivative, concanavalin A, or Cibacron Blue F3G-A.

17. A method for analysis comprising:
providing the electrospray device of claim 1; and
selectively immobilizing affinity ligands on the flow-contacting surface of the device.
18. The method of claim 17, wherein said affinity chromatographic adsorbent comprises an immobilized metal ion chelating ligand.
19. The method of claim 18, wherein said immobilized metal ion chelating ligand comprises iminodiacetic acid, nitrilo triacetic acid, or tris(carboxymethyl) ethylene diamine.
20. The method of claim 17, wherein said affinity chromatographic adsorbent comprises an immobilized ligand molecule comprising an organic compound, fatty acid, inhibitor, protein, peptide, enzyme, coenzyme, receptor, affinity tag, nucleic acid, antibody, biotin, avidin, carbohydrate, lectin, dye, or protein surface domain involved in molecular recognition.
21. The method of claim 20, wherein said immobilized ligand molecule comprises a potential drug candidate or a mixture with potential drug candidates from a combinatorial compound library, benzamidine, D-biotin, biotinylated molecules, Avidin, Protein A, antisense peptides, antisense Arg-vasopressin peptide, trypsin, adenosine 5'-monophosphate (5'-AMP), Interleukin-2 receptor, polyamino acids, polyhistidine, histidine, lysine, a fragment of calf thymus DNA, sheep anti-rabbit IgG, monosaccharide, monosaccharide derivative, concanavalin A, or Cibacron Blue F3G-A.
22. The method of claim 17, wherein said device further comprises a micro column in fluid communication with said flow-contacting portions and having an affinity

chromatographic adsorbent within said micro column, said method further comprising selectively immobilizing affinity ligands on the flow-contacting surface within said micro column.

23. The method of claim 22, wherein said affinity chromatographic adsorbent within said micro column comprises an immobilized metal ion chelating ligand.

24. The method of claim 23, wherein said immobilized metal ion chelating ligand comprises iminodiacetic acid, nitrilo triacetic acid, or tris(carboxymethyl) ethylene diamine.

25. The method of claim 22, wherein said affinity chromatographic adsorbent comprises an immobilized ligand molecule comprising an organic compound, fatty acid, inhibitor, protein, peptide, enzyme, coenzyme, receptor, affinity tag, nucleic acid, antibody, biotin, avidin, carbohydrate, lectin, dye, or protein surface domain involved in molecular recognition.

26. The method of claim 25, wherein said immobilized ligand molecule comprises a potential drug candidate or a mixture with potential drug candidates from a combinatorial compound library, benzamidine, D-biotin, biotinylated molecules, Avidin, Protein A, antisense peptides, antisense Arg-vasopressin peptide, trypsin, adenosine 5'-monophosphate (5'-AMP), Interleukin-2 receptor, polyamino acids, polyhistidine, histidine, lysine, a fragment of calf thymus DNA, sheep anti-rabbit IgG, monosaccharide, monosaccharide derivative, concanavalin A, or Cibacron Blue F3G-A.

27. An electrospray device comprising a monolithic silicon microchip having an array of multiple inlet reservoirs in fluid communication with a respective one of an array of multiple nozzles through a channel and a capillary tube in fluid communication with an inlet reservoir, wherein at least one of the reservoir/channel and capillary tube contain at least one immobilized affinity chromatographic adsorbent.

28. The device of claim 27, wherein said affinity chromatographic adsorbent is immobilized as a coated layer on the inner wall of said at least one reservoir/channel and capillary tube.

29. The device of claim 27, wherein said affinity chromatographic adsorbent is immobilized as a porous polymer monolith in the lumen of said at least one reservoir/channel and capillary tube.

30. The device of claim 27, wherein said affinity chromatographic adsorbent is immobilized by either covalent bonding or non-covalent adhering onto the inner wall of said at least one reservoir/channel and capillary tube.

31. The device of claim 27, wherein said array comprises 96 in 8 columns \times 12 rows or 384 reservoirs/nozzles in 16 columns \times 24 rows containing one or multiple affinity chromatographic adsorbents in the form of porous polymer monoliths or coated layers.

32. The device of claim 31, wherein said array comprises multiple affinity chromatographic adsorbents in a pattern such that different rows or columns have different affinity adsorbents while each reservoir/channel in the same row or column has the same adsorbent.

33. The device of claim 32, wherein said different affinity adsorbents are prepared from one support matrix with different affinity ligands.

34. The device of claim 27, wherein the affinity chromatographic adsorbents in the reservoir/channel are different than the affinity chromatographic adsorbents in the capillary tube.

35. The device of claim 27, wherein said affinity chromatographic adsorbent comprises an immobilized metal ion chelating ligand.

36. The device of claim 35, wherein said immobilized metal ion chelating ligand comprises iminodiacetic acid, nitrilo triacetic acid, or tris(carboxymethyl) ethylene diamine.

37. The device of claim 27, wherein said affinity chromatographic adsorbent comprises an immobilized ligand molecule comprising an organic compound, fatty acid, inhibitor, protein, peptide, enzyme, coenzyme, receptor, affinity tag, nucleic acid, antibody, biotin, avidin, carbohydrate, lectin, dye, or protein surface domain involved in molecular recognition.

38. The device of claim 37, wherein said immobilized ligand molecule comprises a potential drug candidate or a mixture with potential drug candidates from a combinatorial compound library, benzamidine, D-biotin, biotinylated molecules, Avidin, Protein A, antisense peptides, antisense Arg-vasopressin peptide, trypsin, adenosine 5'-monophosphate (5'-AMP), Interleukin-2 receptor, polyamino acids, polyhistidine, histidine, lysine, a fragment of calf thymus DNA, sheep anti-rabbit IgG, monosaccharide, monosaccharide derivative, concanavalin A, or Cibacron Blue F3G-A.

39. A method for analysis comprising:

- providing the electrospray device of claim 27;

- selectively binding an analyte on said affinity chromatographic adsorbent by affinity capture;

- optionally, performing chemical, enzymatic, or physical treatment of said immobilized analyte;

- selectively desorbing said analyte;

- electrospraying said desorbed analyte; and

- passing said electrosprayed analyte to a detector.

40. The method of claim 39, wherein said affinity chromatographic adsorbent comprises an immobilized metal ion chelating ligand.

41. The method of claim 40, wherein said immobilized metal ion chelating ligand comprises iminodiacetic acid, nitrilo triacetic acid, or tris(carboxymethyl) ethylene diamine.
42. The method of claim 39, wherein said affinity chromatographic adsorbent comprises an immobilized ligand molecule comprising an organic compound, fatty acid, inhibitor, protein, peptide, enzyme, coenzyme, receptor, affinity tag, nucleic acid, antibody, biotin, avidin, carbohydrate, lectin, dye, or protein surface domain involved in molecular recognition.
43. The method of claim 42, wherein said immobilized ligand molecule comprises a potential drug candidate or a mixture with potential drug candidates from a combinatorial compound library, benzamidine, D-biotin, biotinylated molecules, Avidin, Protein A, antisense peptides, antisense Arg-vasopressin peptide, trypsin, adenosine 5'-monophosphate (5'-AMP), Interleukin-2 receptor, polyamino acids, polyhistidine, histidine, lysine, a fragment of calf thymus DNA, sheep anti-rabbit IgG, monosaccharide, monosaccharide derivative, concanavalin A, or Cibacron Blue F3G-A.
44. The method of claim 39, wherein said device comprises a micro column and has an affinity chromatographic adsorbent within said micro column, said method further comprises selectively binding an analyte on said affinity chromatographic adsorbent within said micro column by affinity capture.
45. The method of claim 39, further comprising performing multiple analyses of one or more analytes, including at least one of affinity binding, chemical, enzymatic, and physical modifications of the analytes.
46. The method of claim 39, wherein said affinity binding, chemical, enzymatic, or physical modification, and elution of the analytes is carried out in a two-dimensional mode.
47. The method of claim 39, wherein said detector is a mass spectrometer.

48. A chromatography column comprising an affinity chromatographic adsorbent.
49. The column of claim 49, wherein said affinity chromatographic adsorbent comprises a coated layer.
50. The column of claim 49, wherein said affinity chromatographic adsorbent comprises a porous polymer monolith.
51. The column of claim 49, wherein said affinity chromatographic adsorbent comprises an immobilized metal ion chelating ligand.
52. The column of claim 52, wherein said immobilized metal ion chelating ligand comprises iminodiacetic acid, nitrilo triacetic acid, or tris(carboxymethyl) ethylene diamine.
53. The column of claim 49, wherein said affinity chromatographic adsorbent comprises an immobilized ligand molecule comprising an organic compound, fatty acid, inhibitor, protein, peptide, enzyme, coenzyme, receptor, affinity tag, nucleic acid, antibody, biotin, avidin, carbohydrate, lectin, dye, or protein surface domain involved in molecular recognition.
54. The column of claim 54, wherein said immobilized ligand molecule comprises a potential drug candidate or a mixture with potential drug candidates from a combinatorial compound library, benzamidine, D-biotin, biotinylated molecules, Avidin, Protein A, antisense peptides, antisense Arg-vasopressin peptide, trypsin, adenosine 5'-monophosphate (5'-AMP), Interleukin-2 receptor, polyamino acids, polyhistidine, histidine, lysine, a fragment of calf thymus DNA, sheep anti-rabbit IgG, monosaccharide, monosaccharide derivative, concanavalin A, or Cibacron Blue F3G-A.
55. The column of claim 49, wherein said column comprises a micro column.